Public Meeting on Existing Water Quality Impairments in the Little Calfpasture River

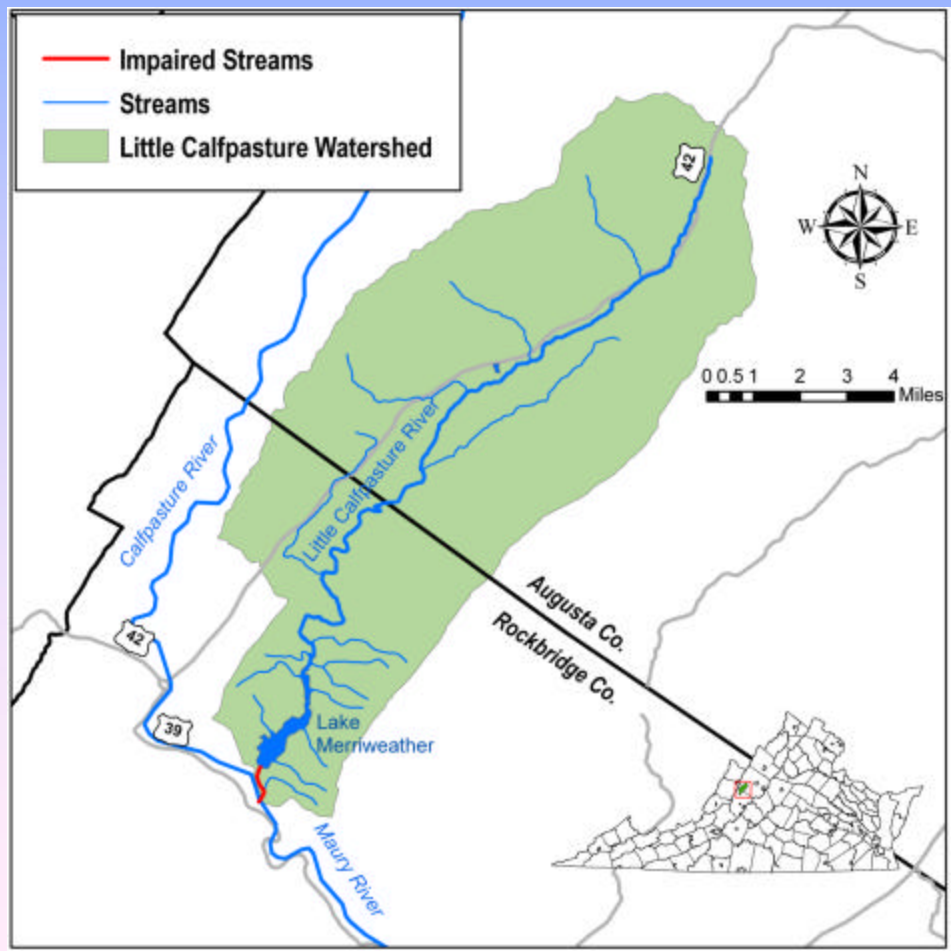
April 14, 2009

What's the Purpose of Tonight's Meeting?

- Learn about existing water quality impairments in the Little Calfpasture River
- Explain efforts that the State is undertaking to address these impairments

What's the Status of the Little Calfpasture River?

- DEQ routinely monitors the quality of waters across the state and reports those results every 2 years
- Since the first such report in 1996, a section of the Little Calfpasture River has been listed as "impaired" for aquatic life
- Impairment begins at the Goshen Dam and extends 0.82 miles downstream to the Maury River



What is an Aquatic Life (Benthic) Impairment?

What does it mean?

- Stream does not fully support a healthy and diverse aquatic life

What is the standard?

- State waters shall be free from pollutants which are harmful to aquatic life

How is it assessed?

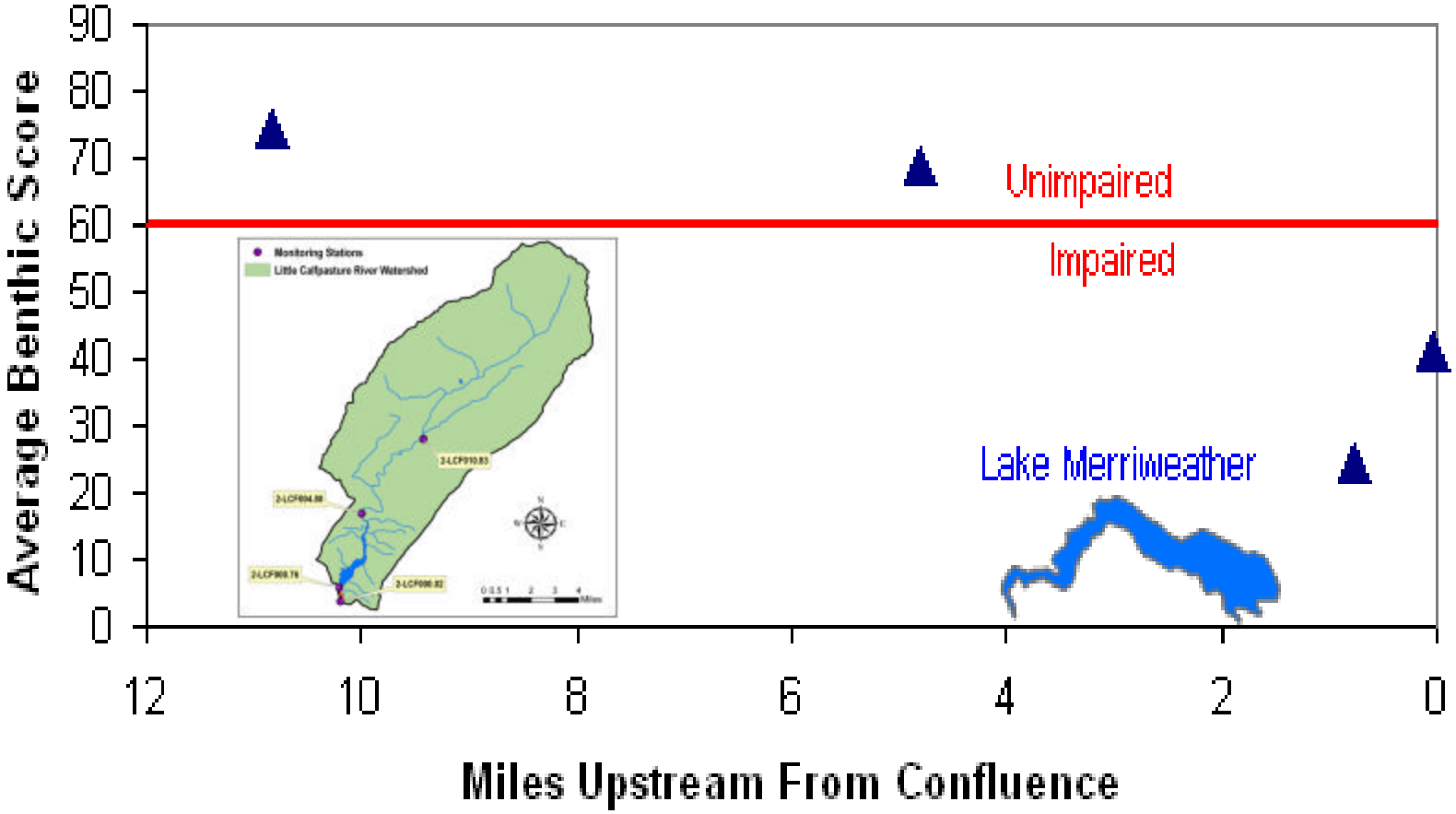
- Biologist collects and identifies benthic macroinvertebrates
- The numbers and kinds of benthic macroinvertebrates collected are compared to a healthy reference condition
- The stream is given a Stream Condition Index (SCI) score (<60 = impaired)

Why Do We Care About the "Bugs"?

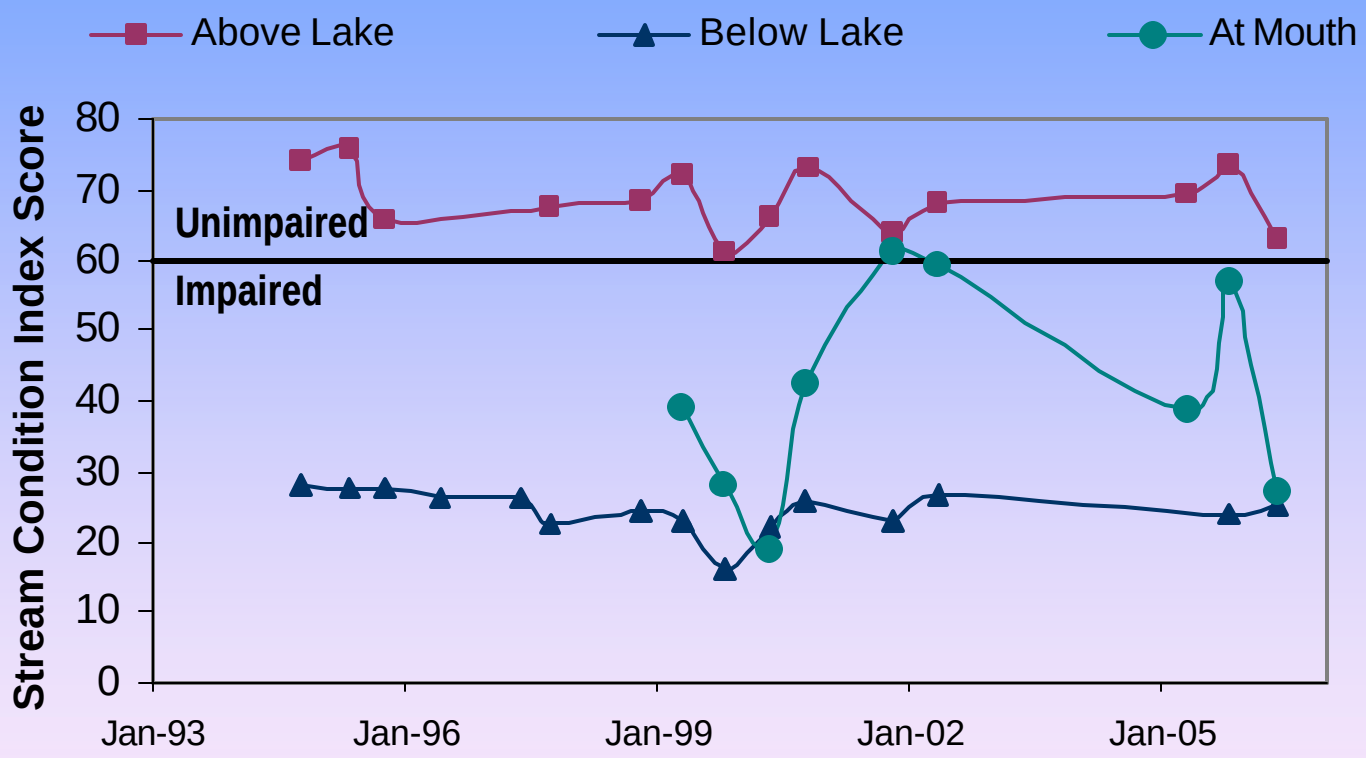
- Important food source for fish
- Important in cycling nutrients
- Good indicators of pollutants and overall stream health

DEQ

Aquatic Life Scores in the Little Calfpasture River



Aquatic Life Scores Over Time

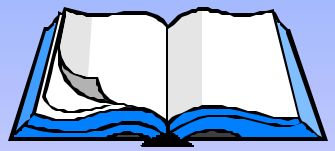


What Happens When a Stream is Impaired?

- The State begins a formal process to clean up that water body (a TMDL)

Total
Maximum
Daily
Load

Implementation Plan



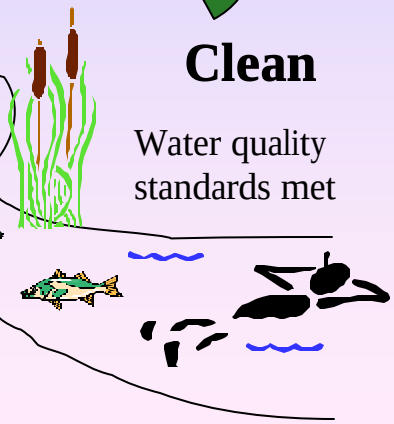
- Identifies permit controls or best management practices needed to make necessary pollutant reductions

Monitoring

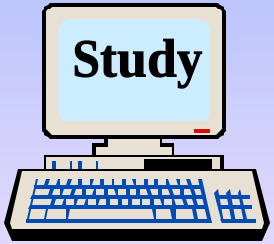
Implementation

Clean

Water quality standards met

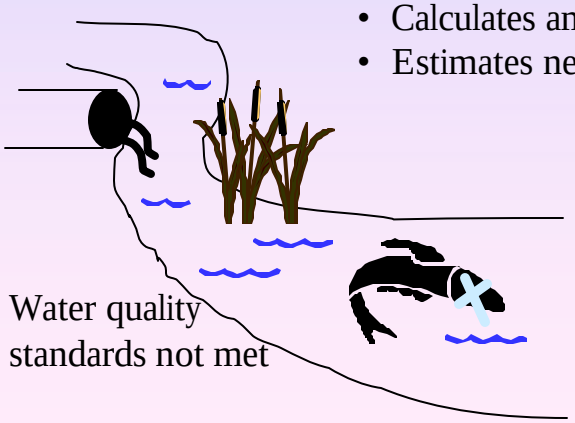


Study



- Identifies sources of pollution
- Calculates amounts from each source
- Estimates necessary pollutant reductions

Polluted

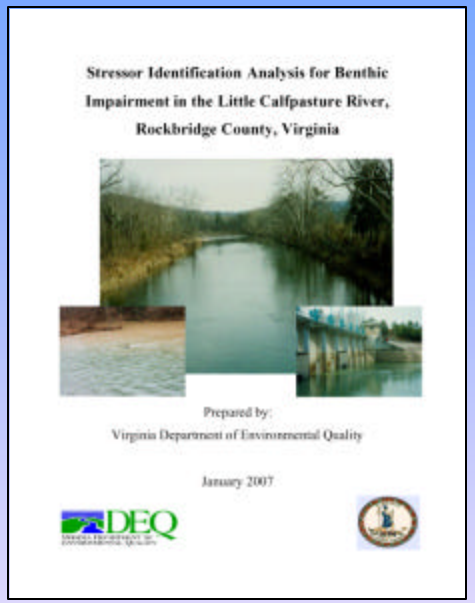


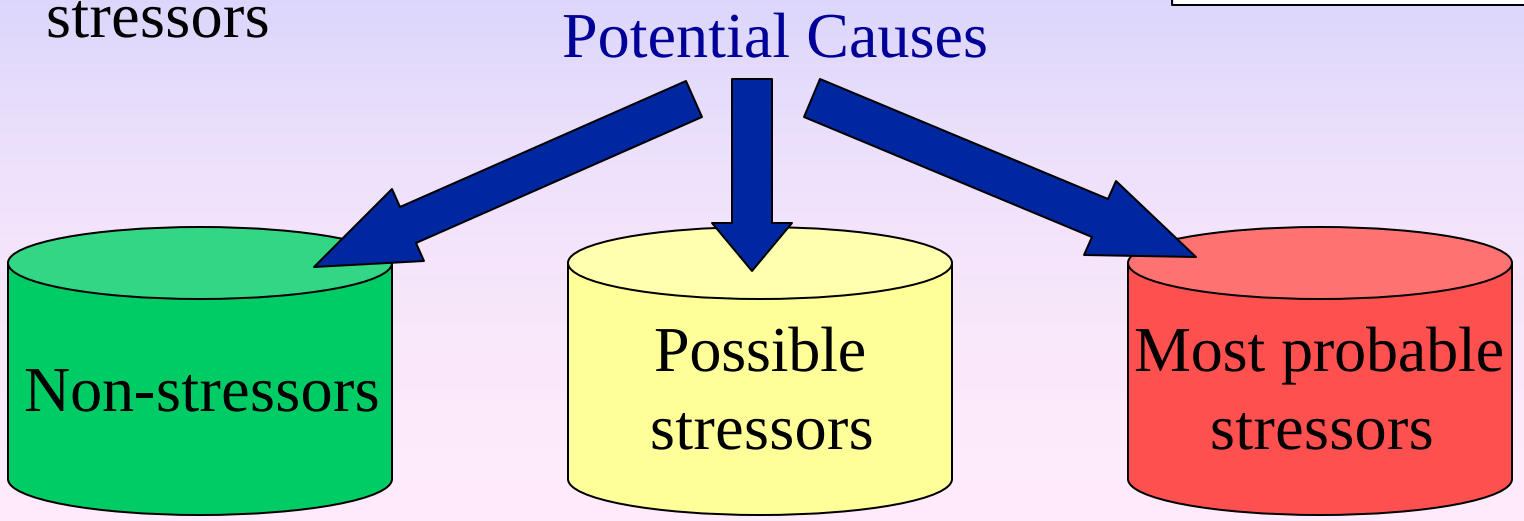
Water quality standards not met

The Process

1st Step in TMDL Development

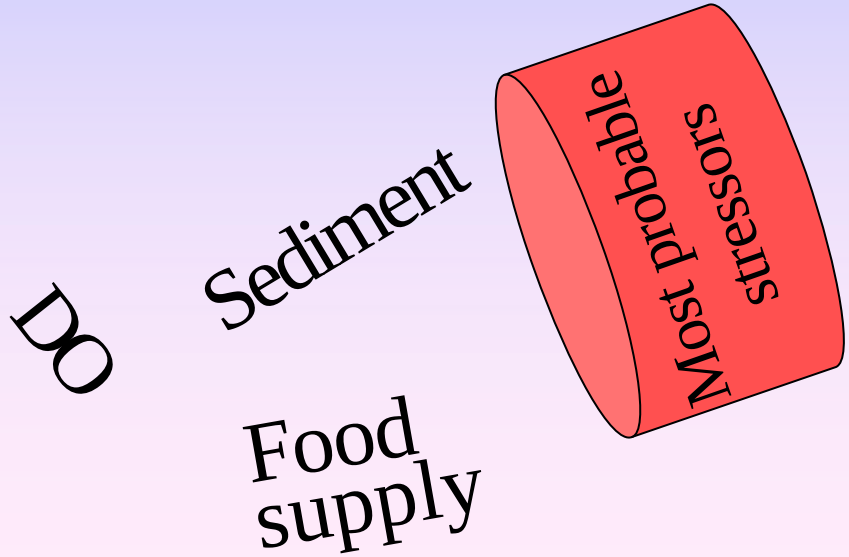
- Stressor Analysis
  - Answers the question: what is causing the impairment?
  - All available water quality and biological data is analyzed
  - DEQ has conducted the stressor analysis and has determined the most probable stressors





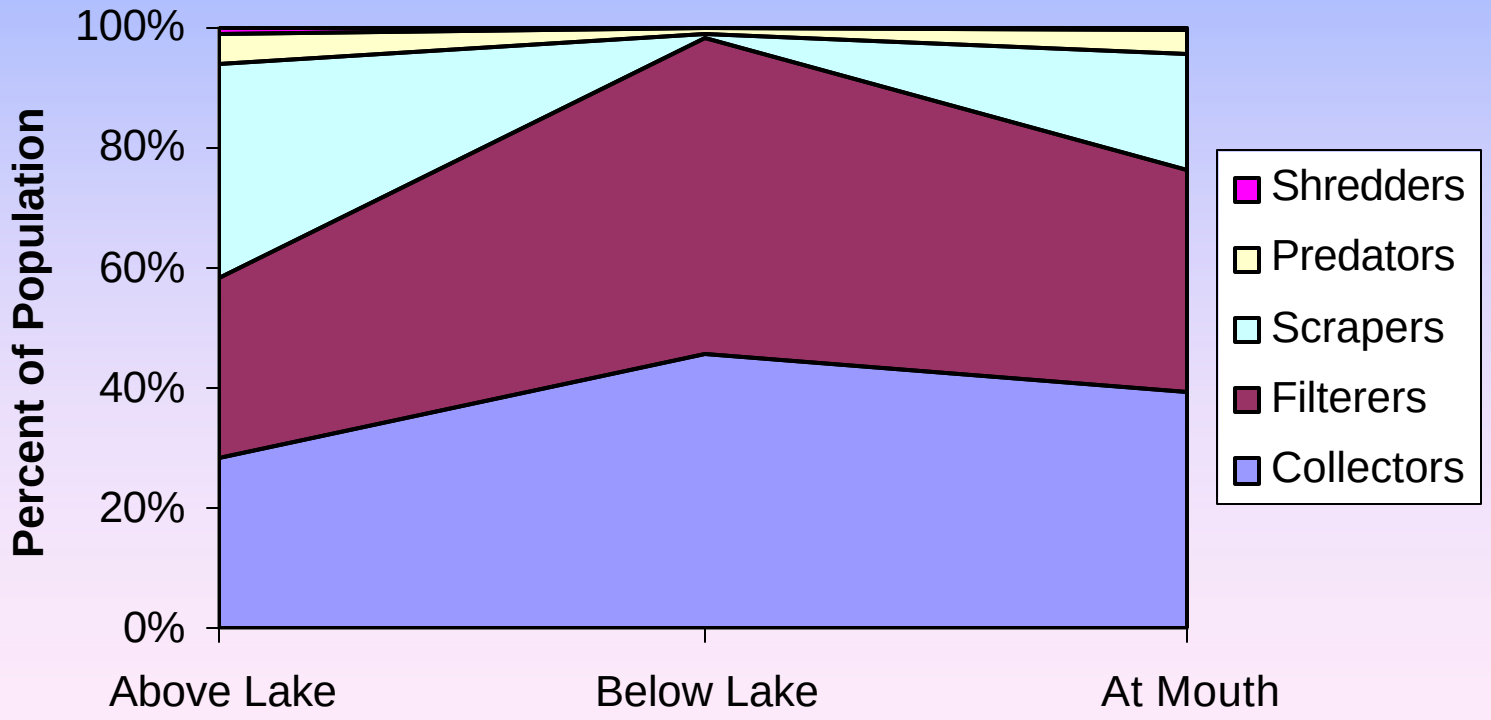
Most Probable Stressors

- Change in available food supply – ecological change in energy dynamics and food supply when a flowing river is impounded
- Dissolved Oxygen – DO below water quality standard at times
- Sediment – physical stress caused by too much sediment smothering available habitat



Change in Available Food Supply

- This stressor will continue to exist regardless of dam design or operation

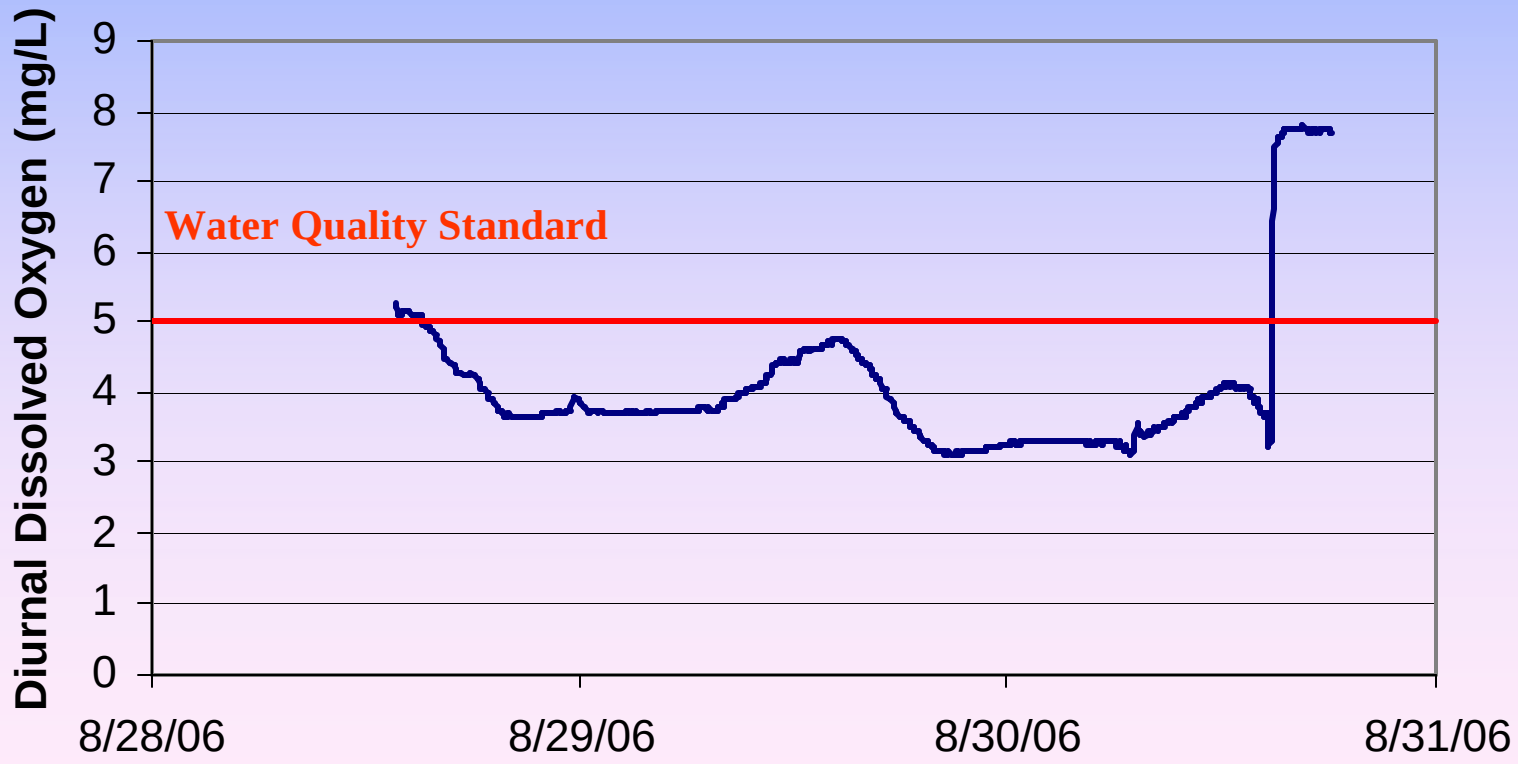


How Will the Available Food Supply Stressor Be Addressed?

- As part of the triennial review of Virginia's water quality standards, DEQ proposed to adopt a special standard that recognizes the presence of the dam
- This special standard requires the following:
  - Aquatic life scores directly below the dam would have to meet a SCI score of 20.5
  - Aquatic life conditions would have to improve and recover from the dam to the mouth of the Little Calfpasture
  - At the mouth of the Little Calfpasture, aquatic life scores would have to meet the traditional SCI score of 60

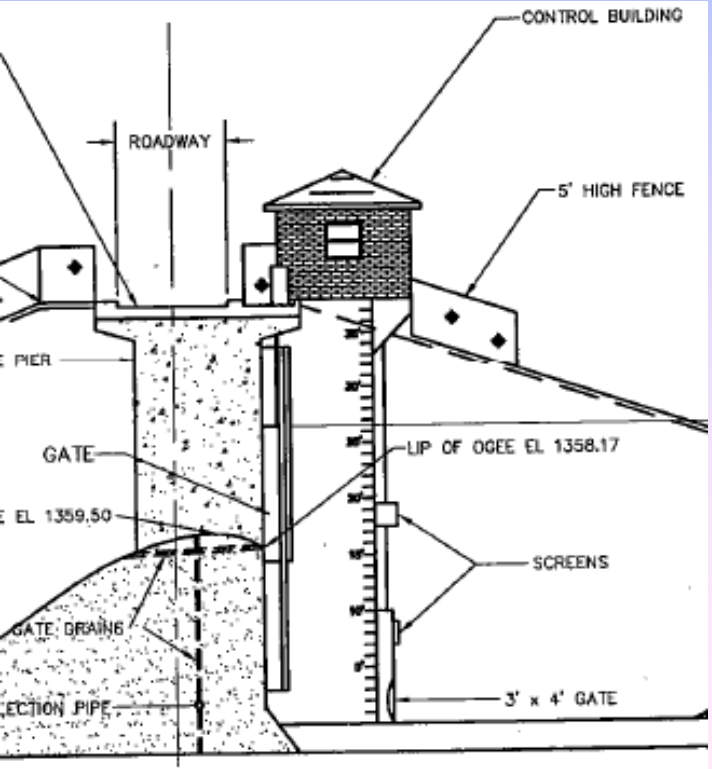
Dissolved Oxygen

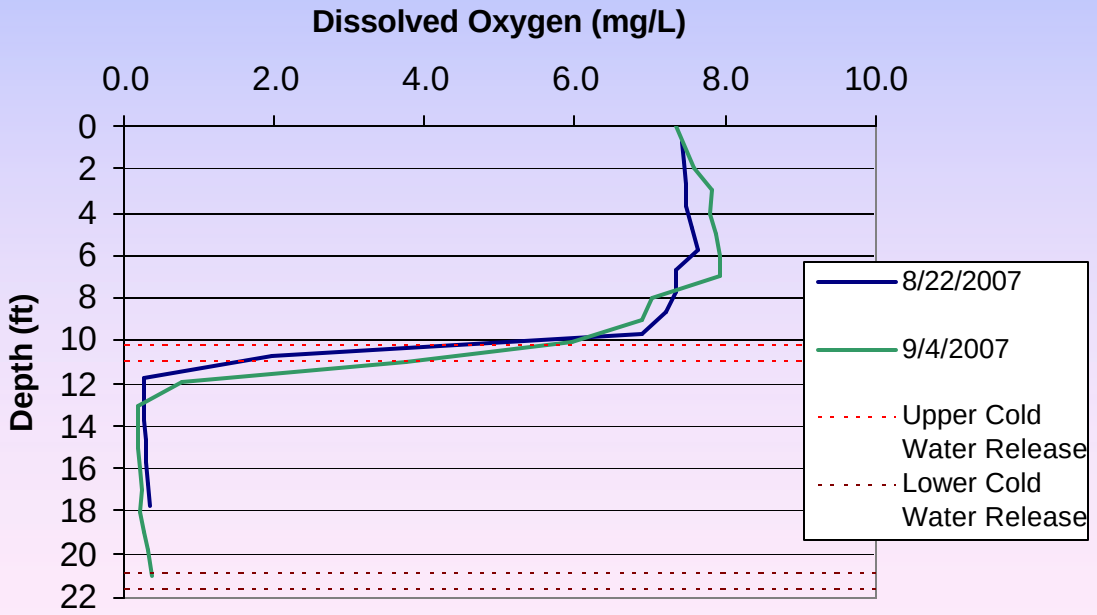
- During the late summer under hot and dry conditions, DO can violate the water quality standard for several days at a time



Why is Dissolved Oxygen Low?

- During very dry conditions, the majority of water released downstream is from deep in the lake
- The lake naturally has very little oxygen below 10-12 feet





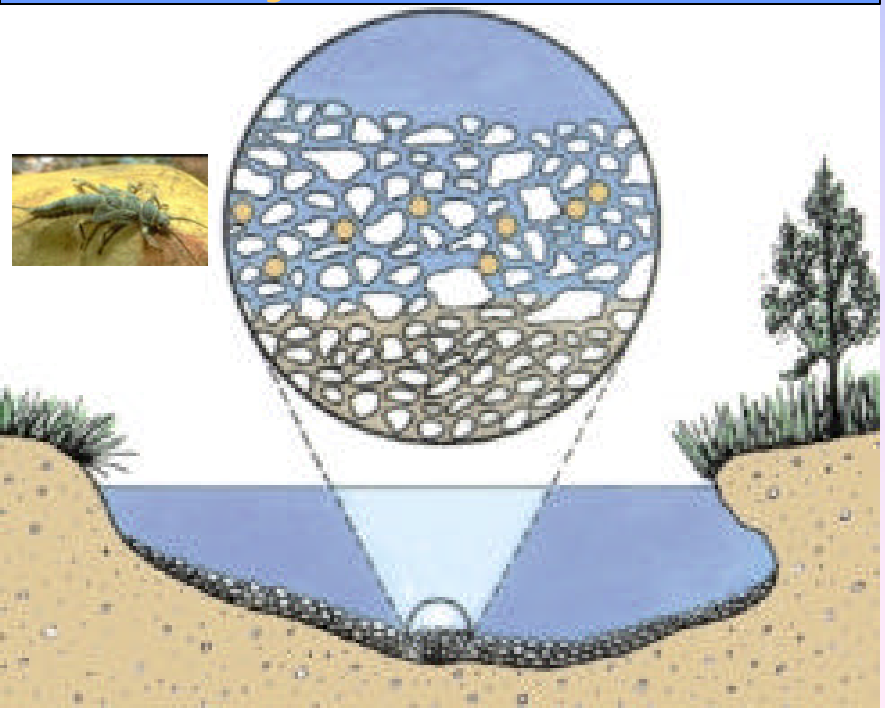
How Will the DO Stressor Be Addressed?

- DEQ has discussed this stressor with the Capital Area Boy Scouts and has provided recommendations on how to remedy the problem
  - Structural changes to the dam, or
  - Operational changes under dry conditions

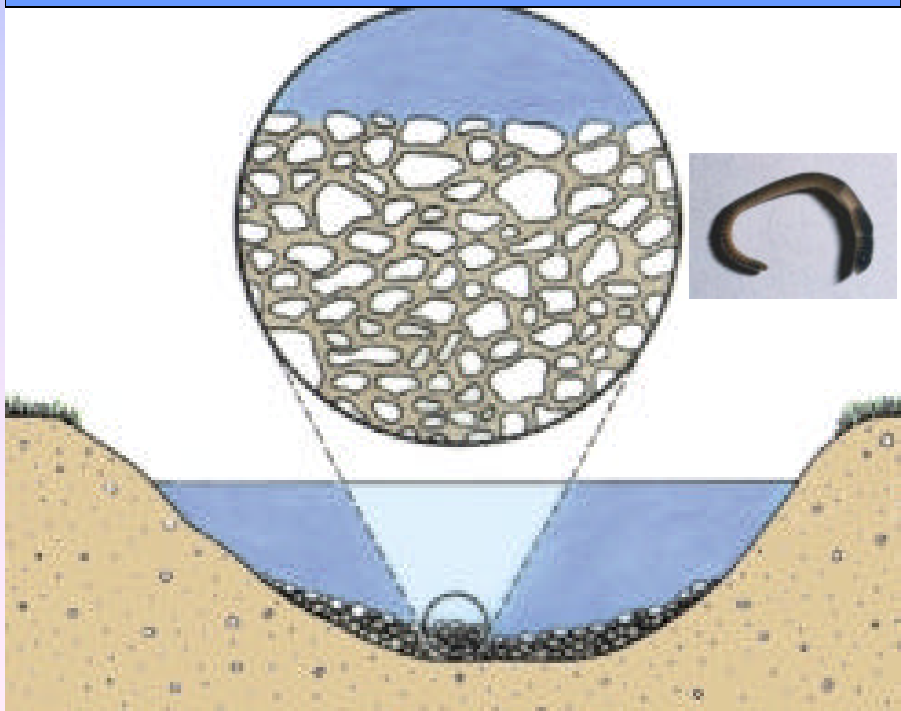
Sediment

- A healthy aquatic community requires a clean stream bottom with lots of space between rocks and gravels
- Sediment from the lake fills in these spaces and smothers aquatic life

Healthy Stream Bottom

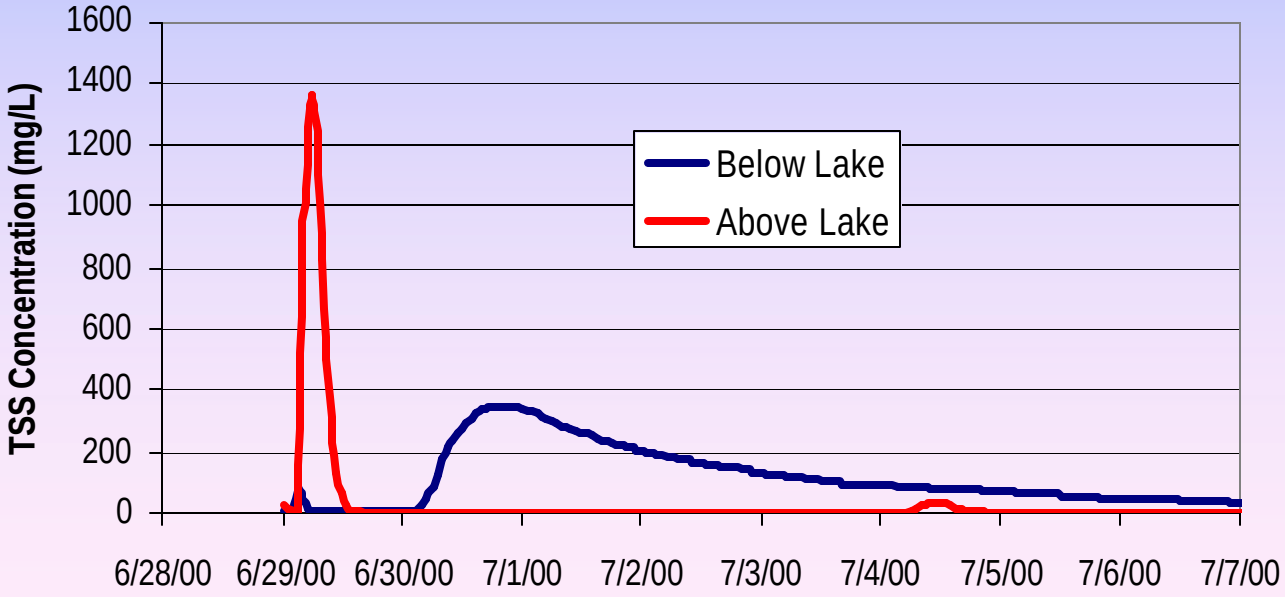


Excess Sediment



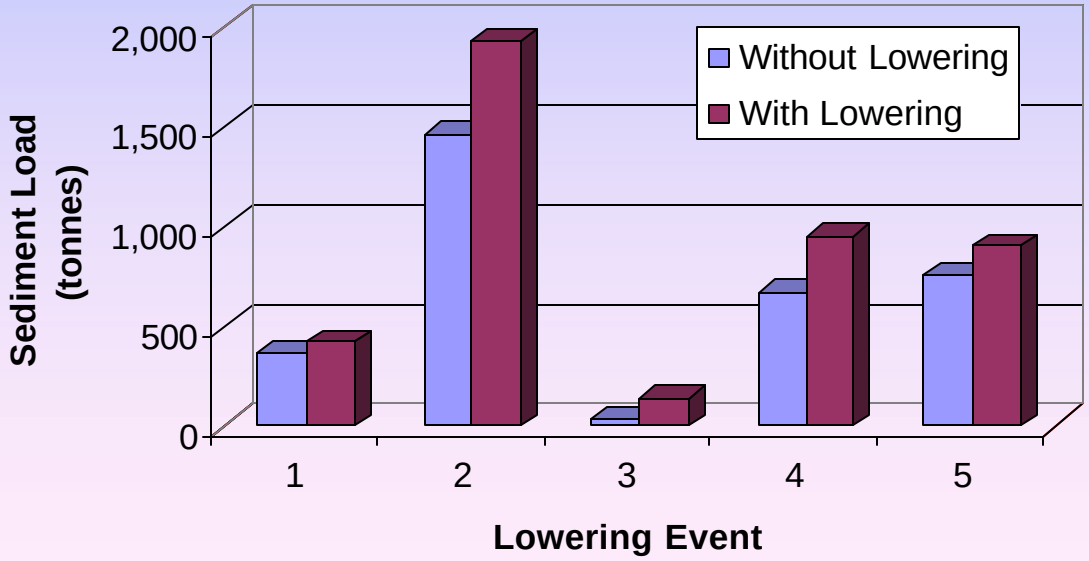
Why is Sediment a Problem?

1. Consequence of a shallow lake that is quickly filling with sediment
   - Overall, the lake captures more sediment than it passes through, but high sediment flows last longer below the lake



Why is Sediment a Problem?

2. Past practices of lowering dam gates during storm events and over the winter have increased downstream sedimentation
   - During lake lowering events, modeled sediment discharges increase by 15 to 335%

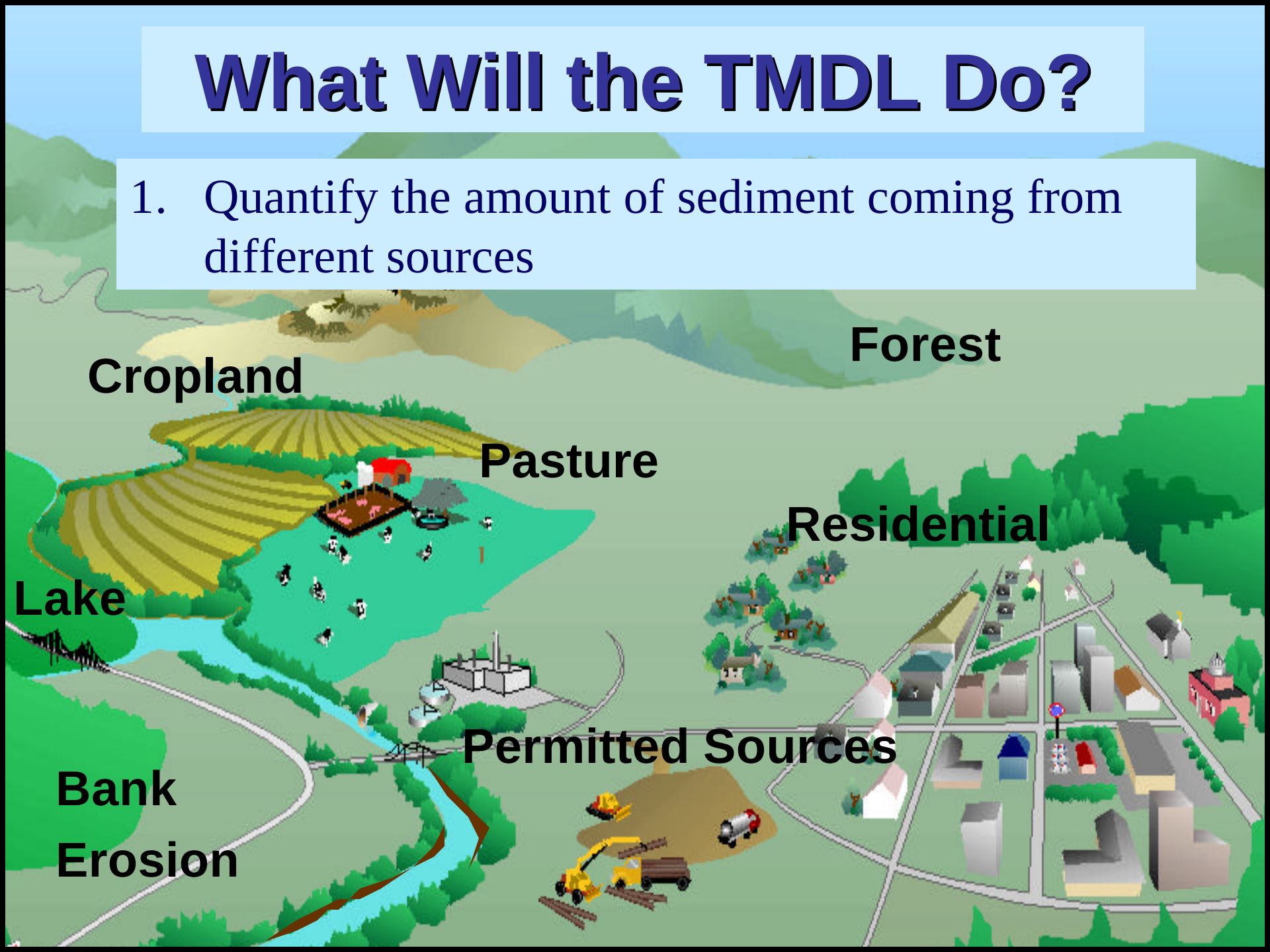


How Will the Sediment Stressor Be Addressed?

- A State Water Control Board consent order is in place, which requires the Capital Area Boy Scouts to keep the lake at full pool except under emergency conditions
- DEQ is developing a TMDL for sediment that is aimed at reducing sediment loads to the lake from the upstream watershed

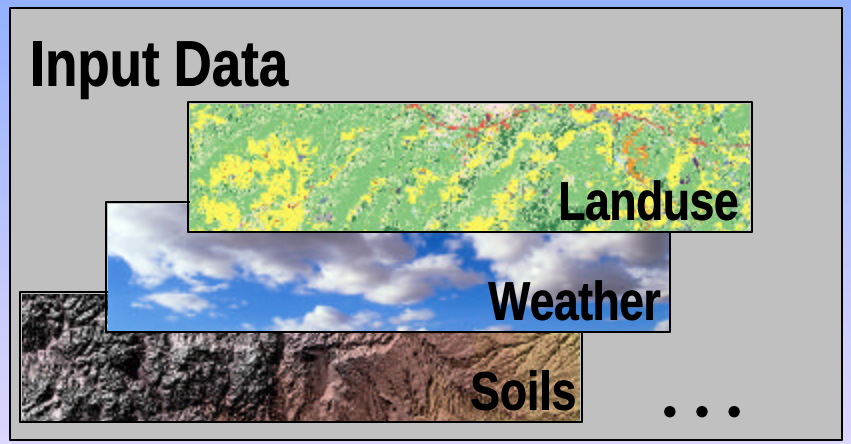
What Will the TMDL Do?

1. Quantify the amount of sediment coming from different sources



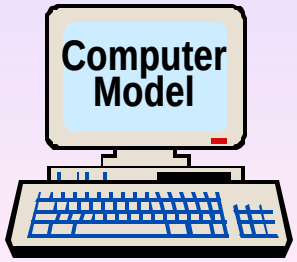
What Will the TMDL Do?

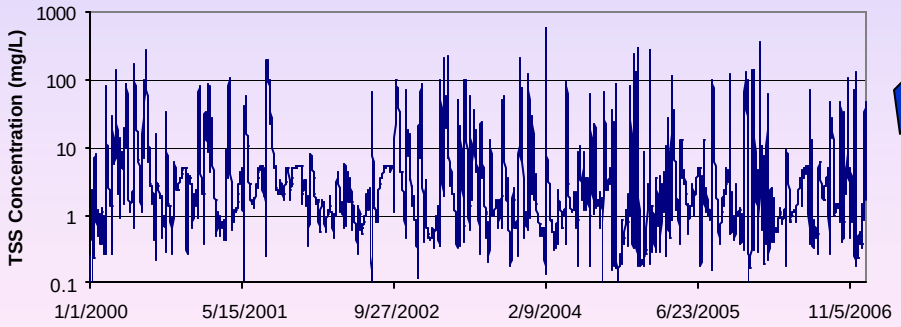
2. **Develop a computer model to simulate instream flows and sediment concentrations**



Calibration

Model Development

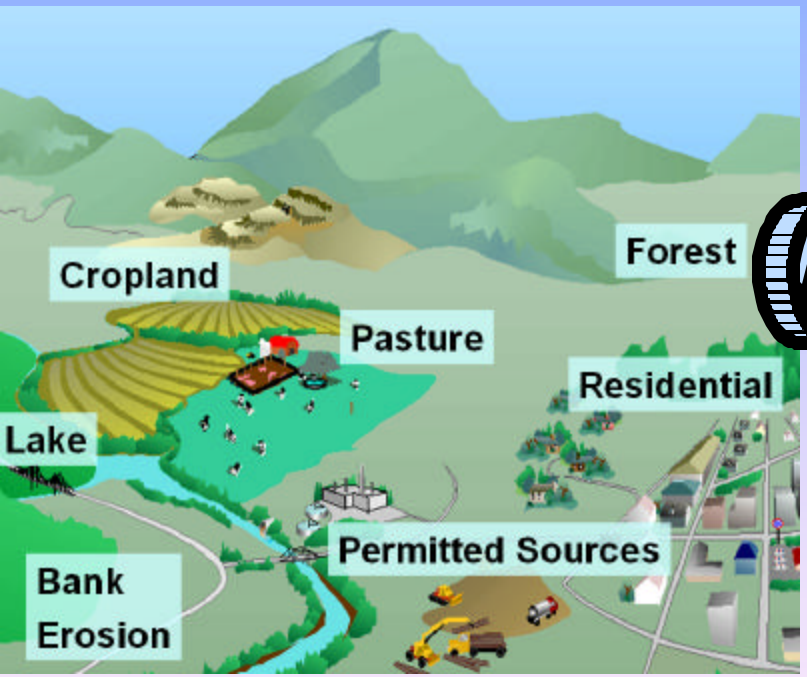


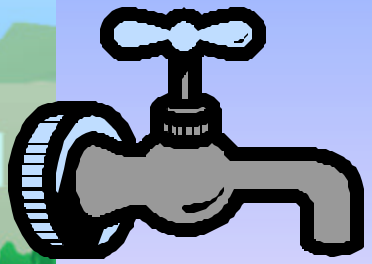


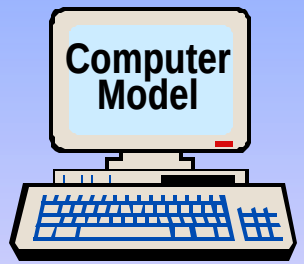
Simulated Results

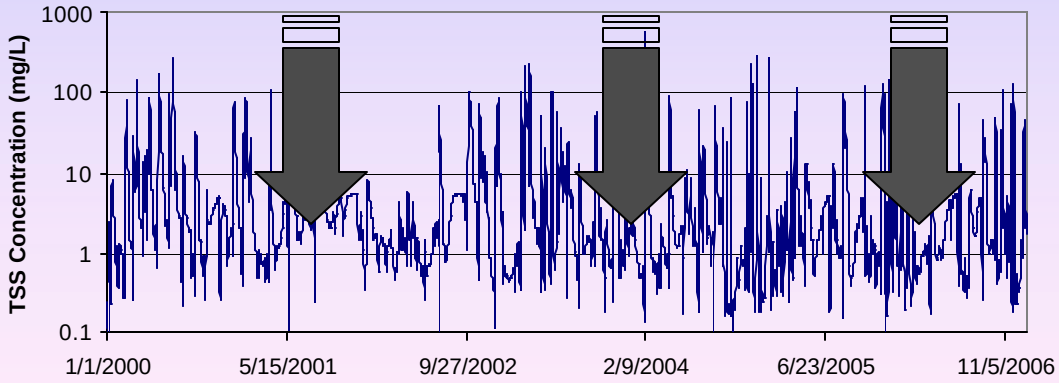
What Will the TMDL Do?

3. Estimate sediment reductions from different sources necessary to restore aquatic life health









DEQ

What's Next?

- Typically form a Technical Advisory Committee that meets throughout the project
  - Group of interested stakeholders, organizations, and government entities that will provide input, review and assistance to DEQ during the study

Questions?

Contact Information

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